CLAIMS:

1. A multi-function apparatus for machining cylindrical objects, comprising:

a shaft;

a rotary support rotatably coupled to said shaft;

a cutting tool positioned in a tool holder at said rotary support;

means for rotating said rotary support and said cutting tool around said shaft;

axial adjustment means for changing the axial position of said cutting tool with respect to said shaft;

radial adjustment means for changing the radial distance of said cutting tool with respect to said shaft, said radial adjustment means comprising a tool slide servomotor in one-to-one communication with an adjustable tool mechanism; and

a controller, said controller regulating said axial adjustment means and said radial adjustment means.

2. An apparatus as in Claim 1, wherein said means for rotating said rotary support comprises a motor in geared communication with said rotary support.

3. An apparatus as in Claim 2, wherein said motor is hydraulically powered.

4. An apparatus as in Claim 2, wherein said motor is electrically powered.

5. An apparatus as in Claim 1, wherein said axial adjustment means comprises a mast feed screw servomotor in geared communication with a mast feed screw.

6. An apparatus as in Claim 1, wherein said tool slide servomotor in one-to-one communication with an adjustable tool mechanism comprises a gearbox servomotor output shaft in one-to-one geared communication with a cutting tool adjustment shaft.

7. An apparatus as in Claim 1, wherein said controller is a computer.

8. An apparatus as in Claim 7, wherein said computer simultaneously controls the axial and radial position of said cutting tool.

9. An apparatus as in Claim 7, wherein said computer controls, via programmed instructions, the movement of said axial adjustment means and said radial adjustment means.

10. A multi-function apparatus that is useful for the machining of pipe, comprising:

a mast, said mast comprising an internal mast feed screw;

a mast feed screw servomotor for turning said mast feed screw;

a non-rotary housing coupled to said mast, said non-rotary housing moveable along said mast;

a rotary housing positioned adjacent to said non-rotary housing and rotatably coupled to said mast, said rotary housing moveable along said mast;

means for rotating said rotary housing about said mast;

an adjustable tool mechanism affixed at said rotary housing, said adjustable tool mechanism comprising a cutting tool and a cutting tool adjustment shaft;

a gearbox servomotor having an output shaft, said gearbox servomotor output shaft in one-to-one geared communication with said cutting tool adjustment shaft to adjust the radial position of said cutting tool relative to said mast; and

a computer in communication with said mast feed screw servomotor and said gearbox servomotor;

wherein said computer transmits signals to and receives signals from said mast feed screw servomotor with respect to the axial position of said adjustable tool mechanism; and

wherein said computer transmits signals to and receives signals from said gearbox servomotor with respect to the radial position of said adjustable tool mechanism.

11. An apparatus as in Claim 10, wherein said mast defines a slotted aperture that limits the axial range of said rotary housing.

12. An apparatus as in Claim 10, wherein a mast feed nut is threadably engaged to said mast feed screw, said mast feed nut mounted to said non-rotary housing.

13. An apparatus as in Claim 10, wherein said rotating means comprises a motor at said non-rotary housing, said motor engaging said rotary housing to thereby rotate said rotary housing about said mast.

14. An apparatus as in Claim 10, wherein the mast feed screw servomotor is hydraulically powered.

15. An apparatus as in Claim 10, wherein the mast feed screw servomotor is electrically powered.

16. An apparatus as in Claim 10, wherein the gearbox servomotor is hydraulically powered.

17. An apparatus as in Claim 10, wherein the gearbox servomotor is electrically powered.

18. An apparatus as in Claim 10, further comprising a slideable sleeve member, said slideable sleeve member positioned about said mast and affixed to said rotary housing, wherein said slideable sleeve member allows rotation of the rotary housing about said mast.

19. An apparatus as in Claim 10, further comprising a slideable sleeve member, said slideable sleeve member positioned about said mast and affixed to said rotary housing, wherein said slideable sleeve member allows movement of the rotary housing along said mast.

20. An apparatus as in Claim 10, further comprising a chuck body mounted for securing the apparatus within a pipe, said chuck body mounted substantially perpendicular to said mast.

21. An apparatus as in Claim 20, wherein said apparatus is mounted within a pipe by said chuck body such that said mast is substantially coaxial with the pipe.

22. An apparatus as in Claim 20, wherein said chuck body further comprises a self-centering means.

23. The apparatus as in Claim 22, wherein said self-centering means comprises an electronically controlled self-centering mechanism.

24. The apparatus as in Claim 22, wherein said self-centering means comprises a hydraulically controlled self-centering mechanism.

25. The apparatus as in Claim 22, wherein said self-centering means comprises a pneumatically controlled self-centering mechanism.

26. A method for machining pipe, comprising the steps of:

(a) positioning a cutting tool within a substantially cylindrical pipe, the pipe defining a central axis;

(b) defining an origin point that describes the initial axial position and the initial radial position of the cutting tool with respect to the pipe;

(c) rotating the cutting tool around the central axis while the cutting tool engages the pipe, thereby machining the pipe;

(d) controlling the axial position of the cutting tool; and

(e) controlling the radial position of the cutting tool;

wherein steps (d) and (e) are performed simultaneously under computer control.

27. The method as in Claim 26, wherein the step of positioning a cutting tool further comprises rotating the cutting tool around the central axis and touching off the pipe.

28. The method as in Claim 26, wherein the step of defining an origin point further comprises defining the initial angular orientation of the cutting tool with respect to the central axis.

29. The method as in Claim 26, wherein the step of controlling the axial position of the cutting tool comprises adjusting the axial position of the cutting tool.

30. The method as in Claim 26, wherein the step of adjusting the axial position of the cutting tool comprises signaling a servomotor to axially adjust the cutting tool.

31. The method as in Claim 26, wherein the step of controlling the radial position of the cutting tool comprises adjusting the radial position of the cutting tool.

32. The method as in Claim 31, wherein the step of adjusting the radial position of the cutting tool comprises signaling a servomotor to radially adjust the cutting tool.

33. The method as in Claim 26, further comprising the step of monitoring the angular orientation of the cutting tool with respect to the central axis.

34. A method as in Claim 26, wherein the step of machining the pipe comprises machining the interior diameter of the pipe.

35. A method as in Claim 26, wherein the step of machining the pipe comprises machining the outside diameter of the pipe.

36. A method as in Claim 26, wherein the step of machining the pipe comprises machining the end of the pipe.